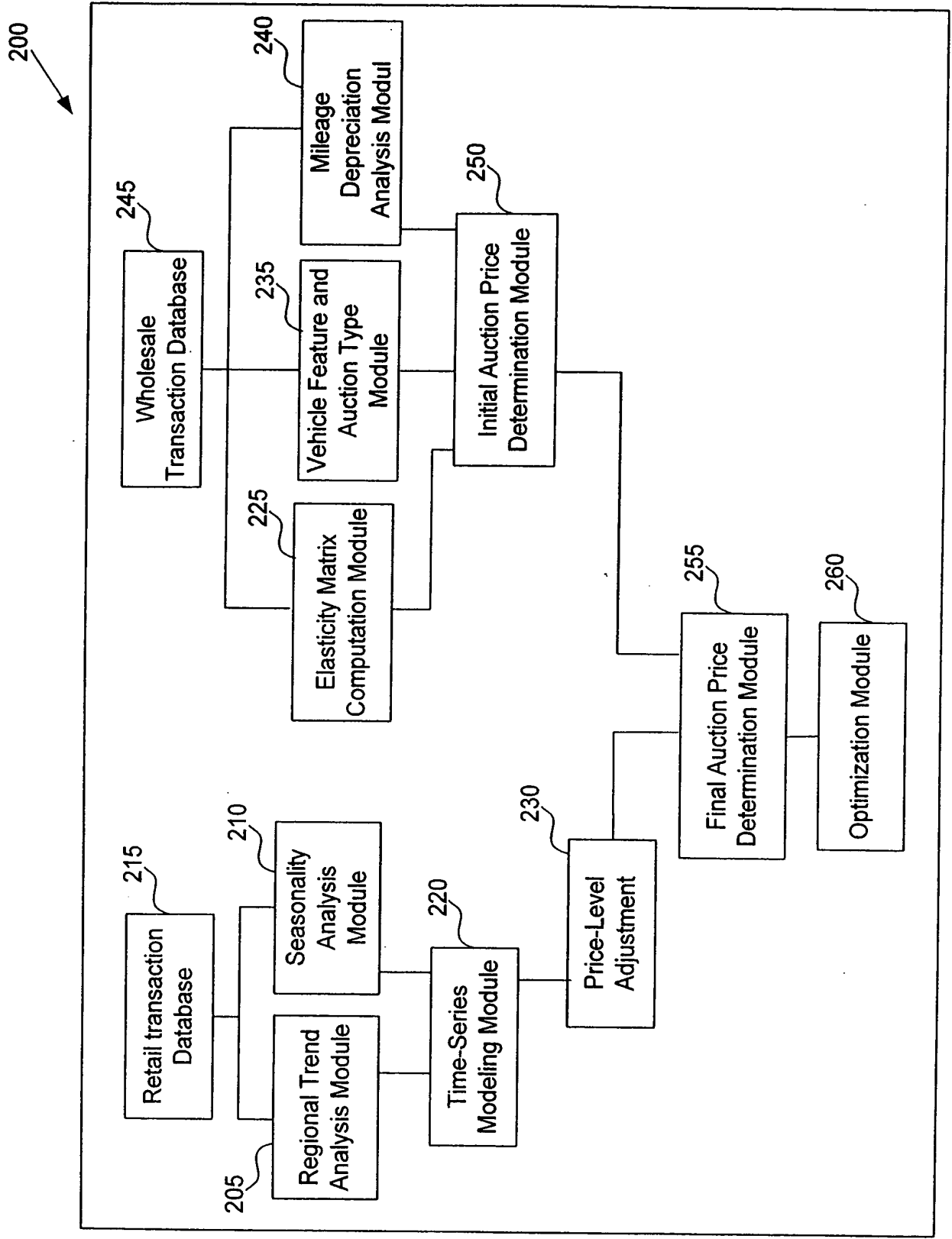
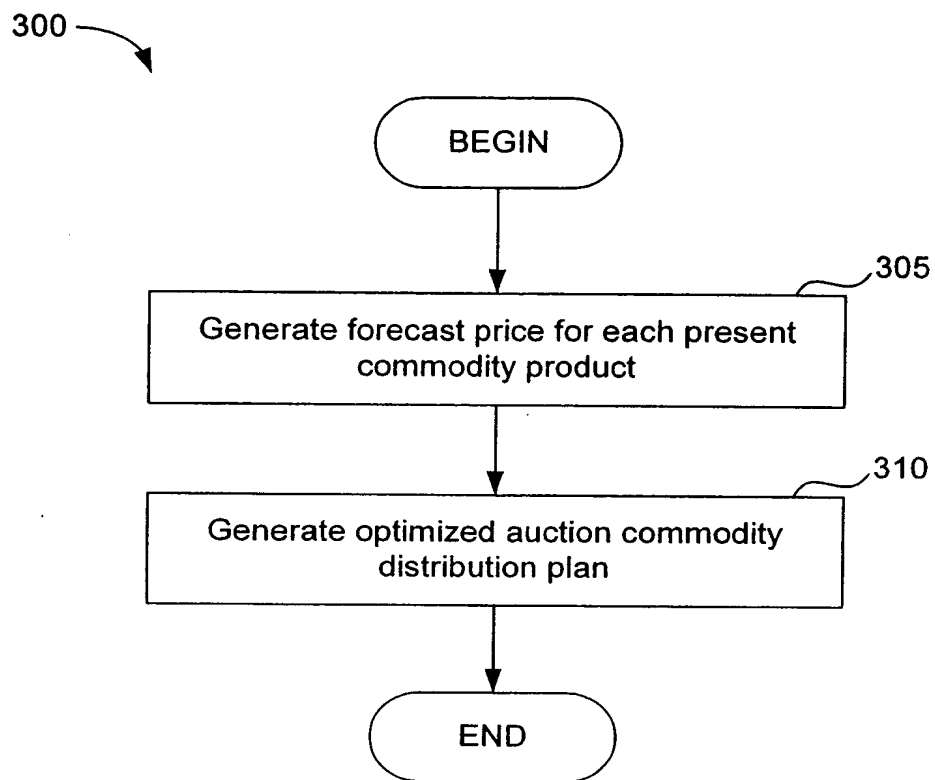


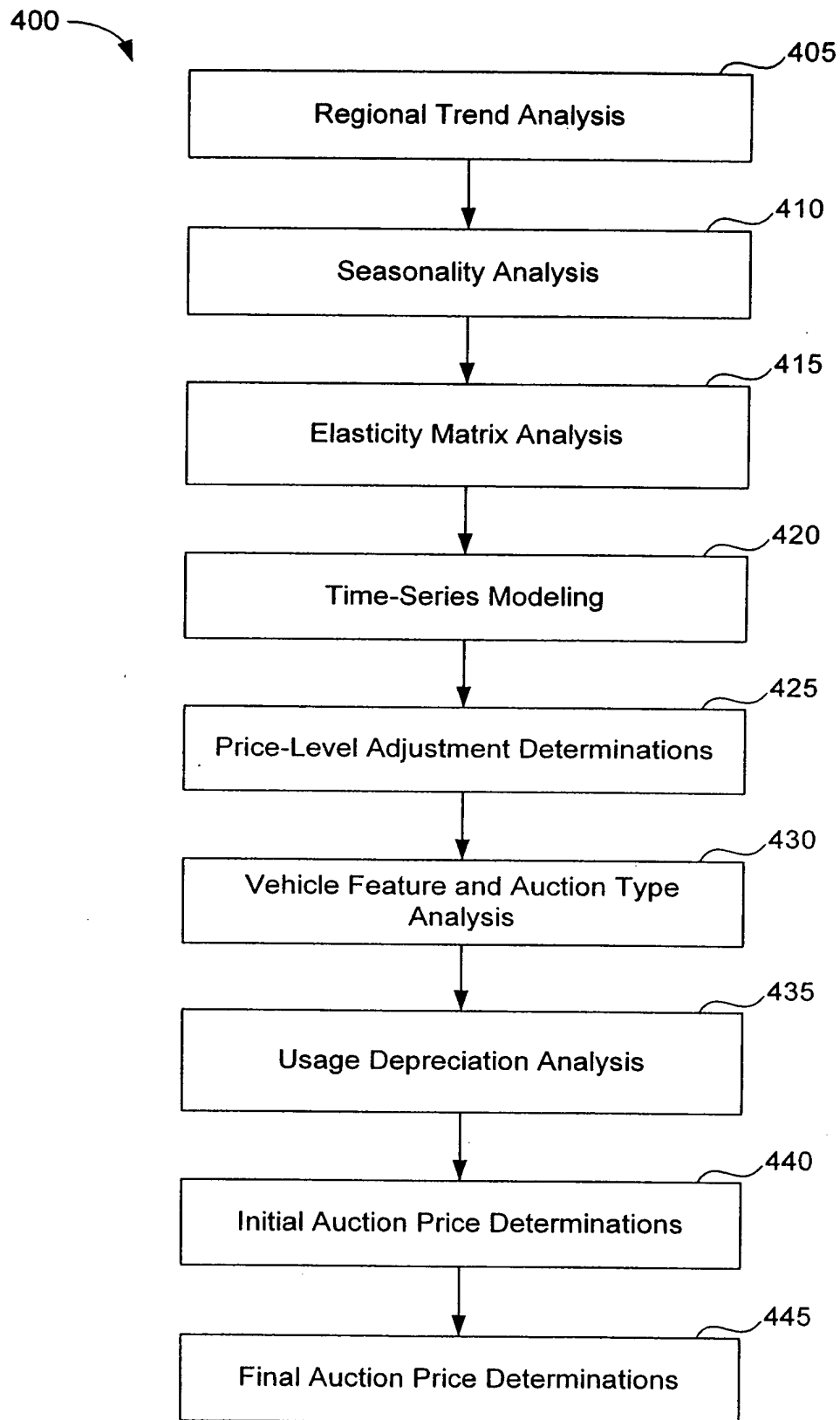
FIG. 1



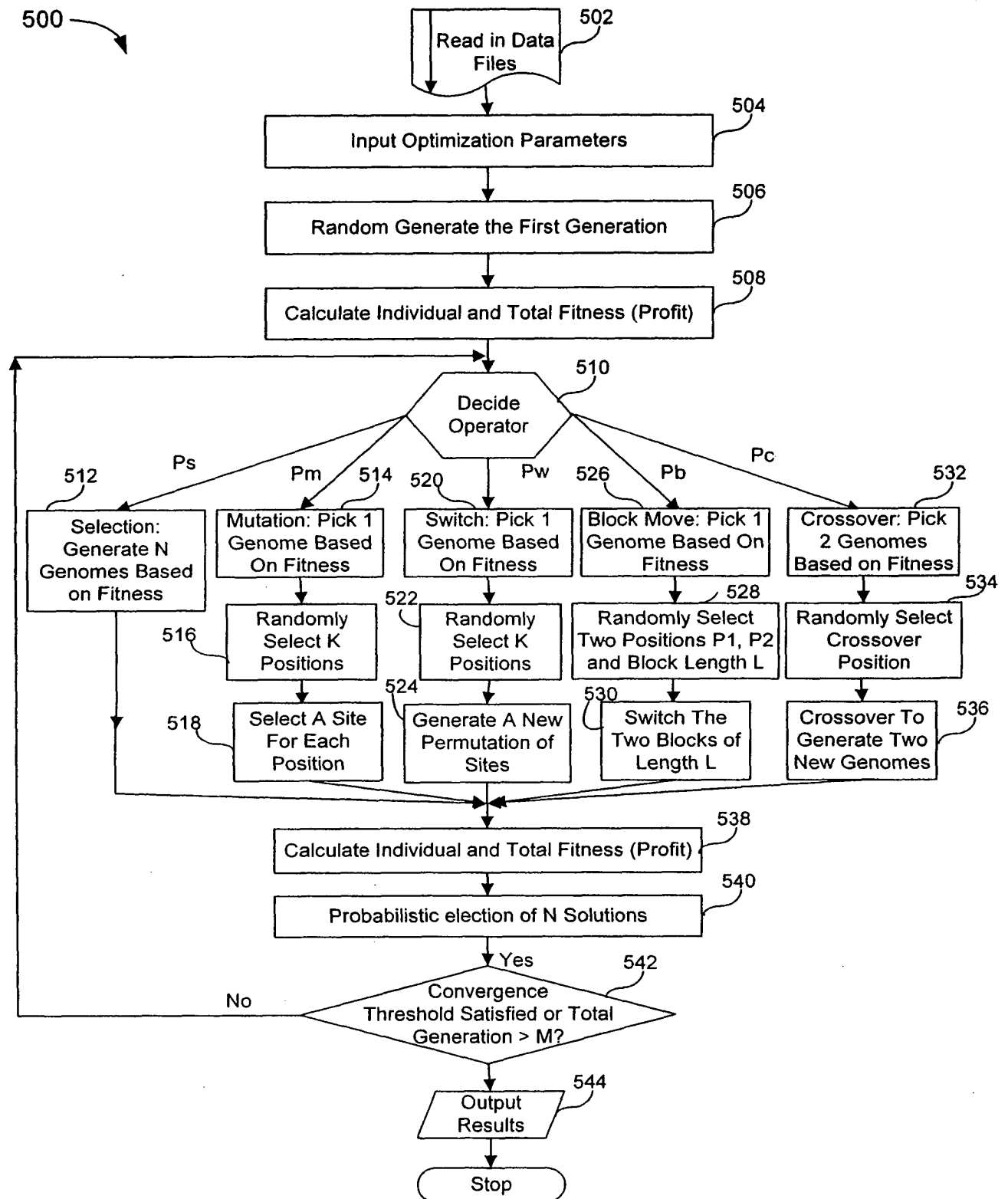
**FIG. 2**



**FIG. 3**



**FIG. 4**

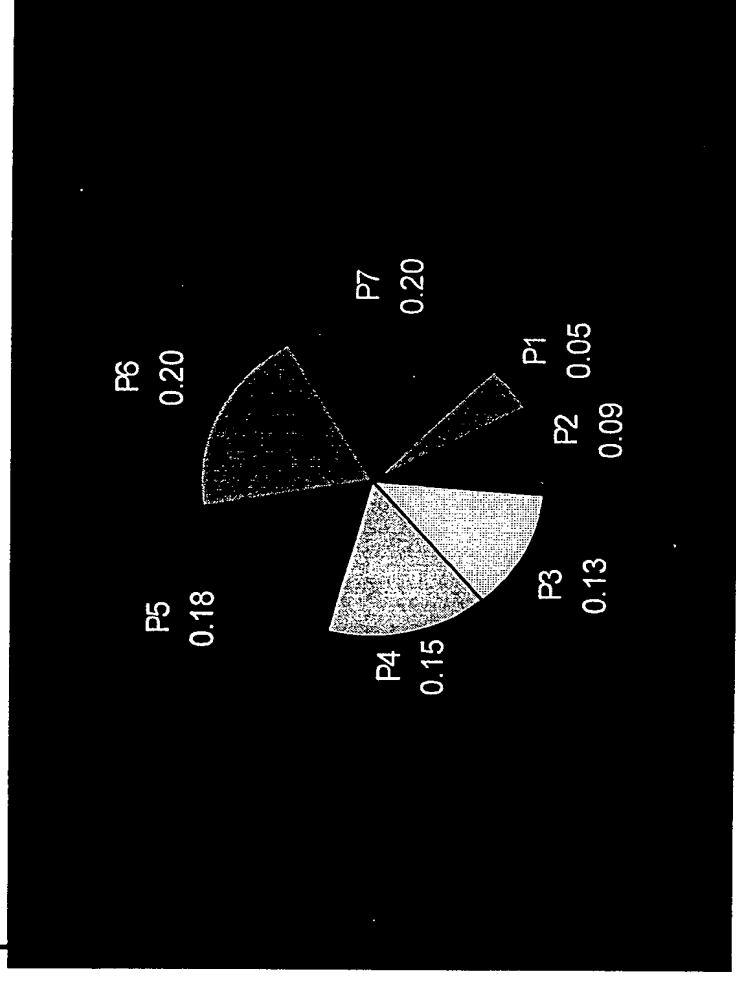


**FIG. 5**

# Genetic Operators

---

- Selection
  - Randomly generates a new generation based on the fitness of the their parents

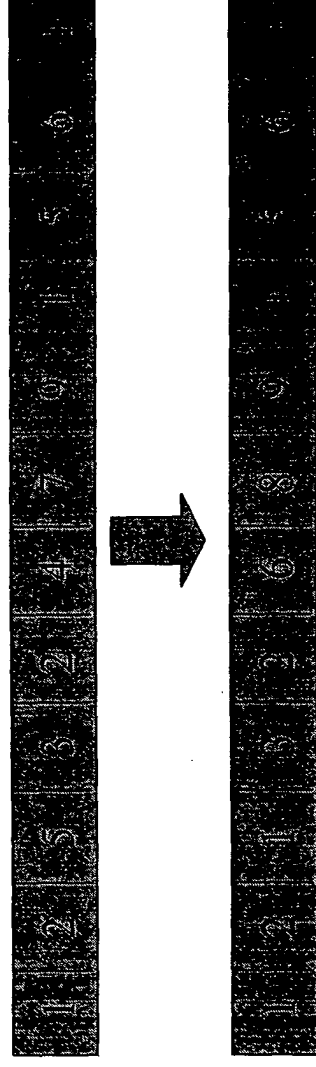


• FIG. 6

# Genetic Operators

---

- Mutation
  - Randomly selects  $N_m$  genes from a genome
  - Randomly assigns new auction sites to the  $N_m$  genes

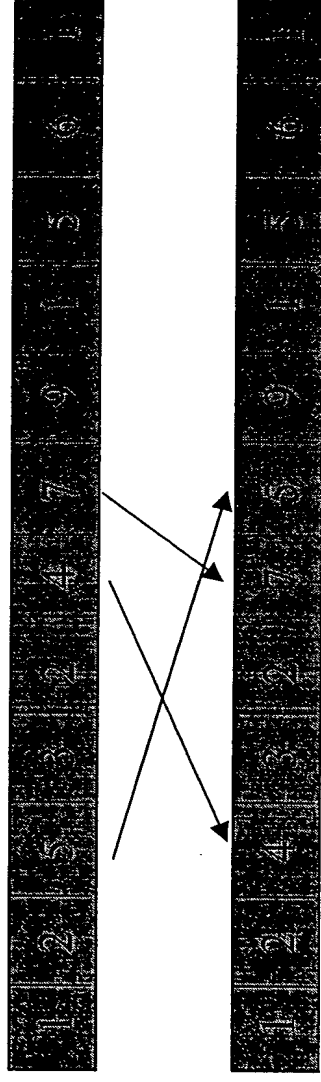


• FIG. 7

# Genetic Operators

---

- Switch
  - Randomly selects  $N_s$  genes from a genome
  - Randomly generates permutation of their auction sites



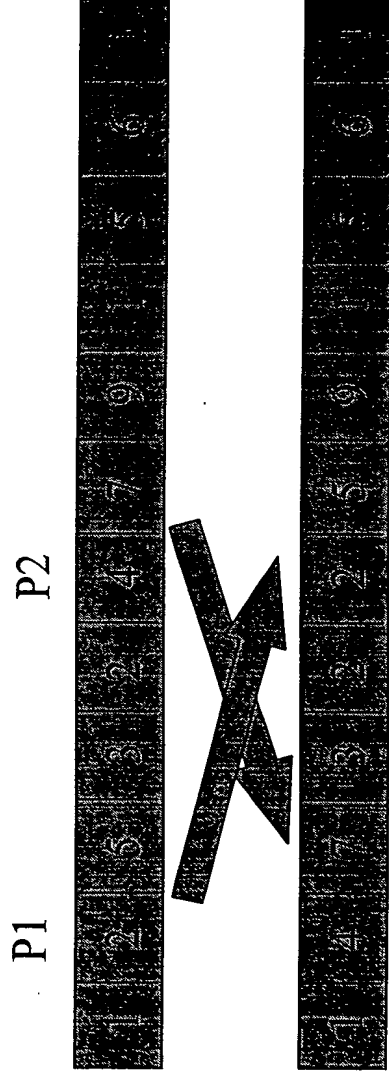
• FIG. 8



# Genetic Operators

---

- Block Move
  - Randomly selects two positions  $p_1$  and  $p_2$  in a genome
  - switch two blocks starting at  $p_1$  and  $p_2$  with length of  $N_b$

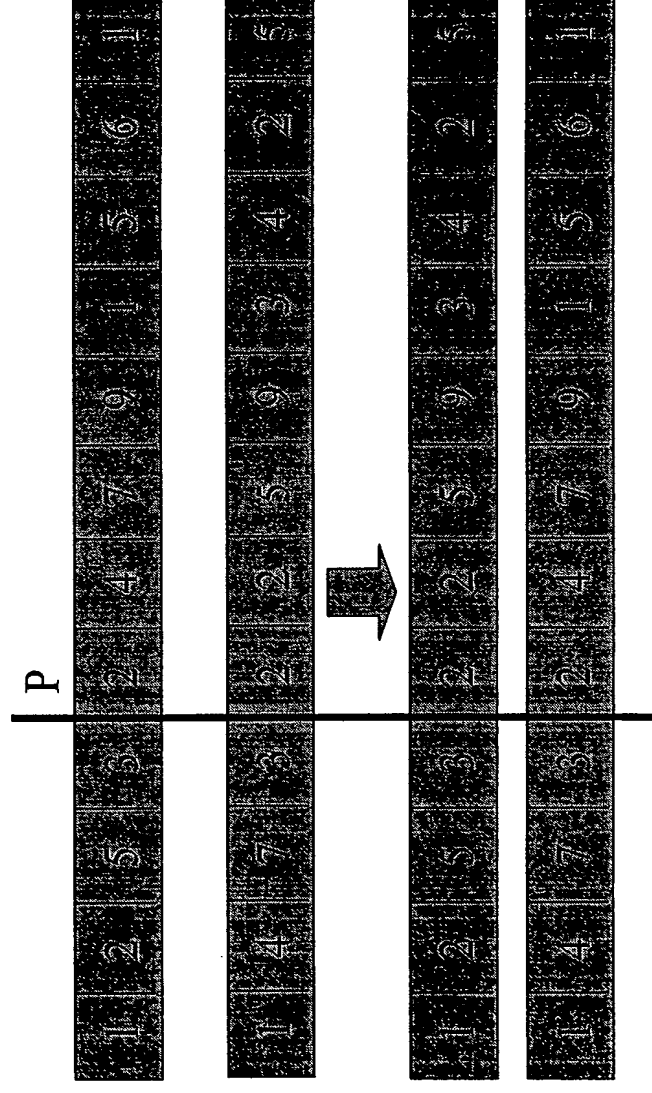


• FIG. 9

# Genetic Operators

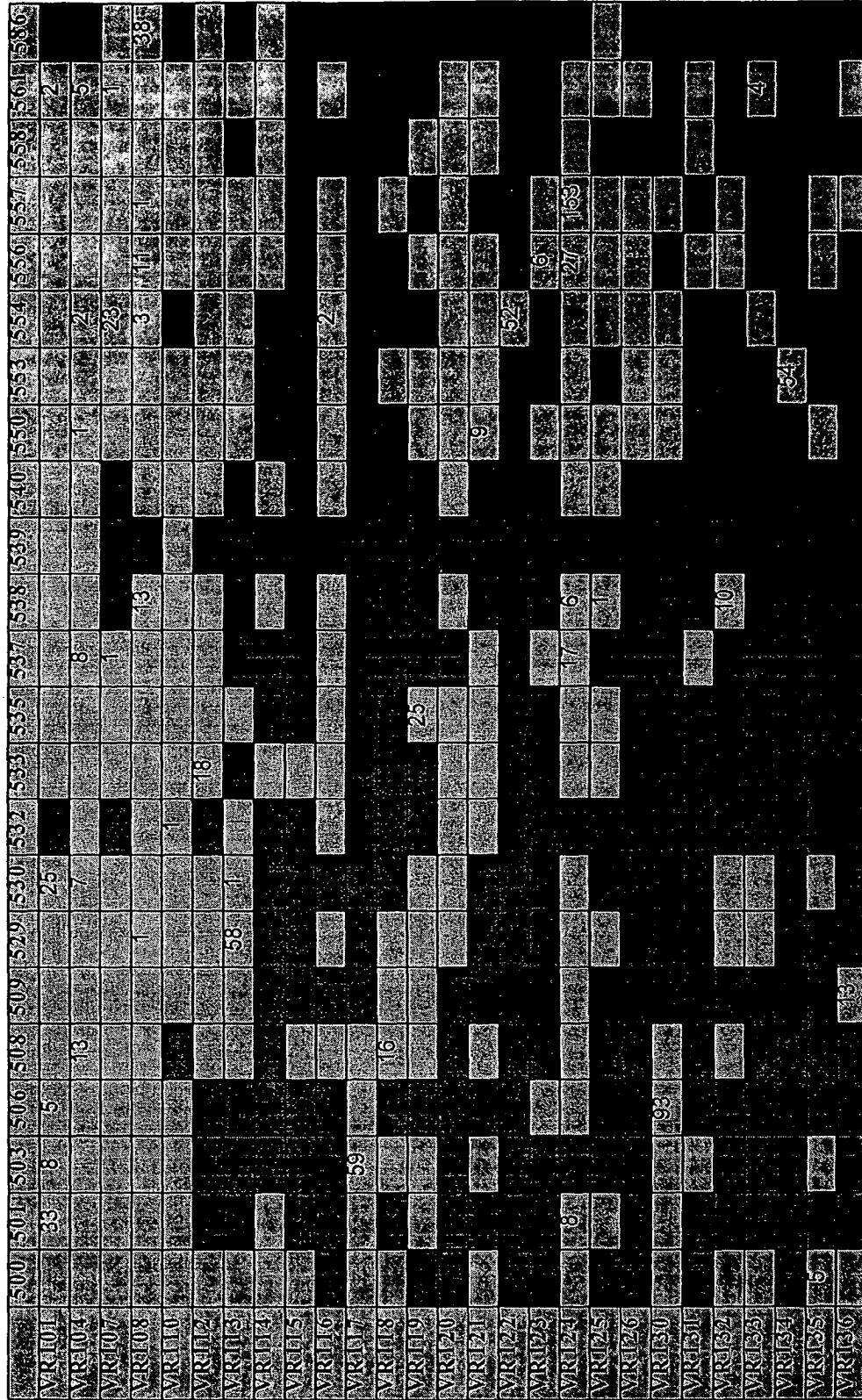
---

- Crossover
  - Randomly selects 2 genomes based on their fitness
  - Randomly selects a position in a genome and crossover the 2 genomes to form two new genomes



• FIG. 10

# Original Auction Vehicle Distribution Plan



• FIG. 11

# Optimized Auction Vehicle Distribution Plan

	500	501	503	506	508	509	529	530	532	533	535	537	538	539	540	550	553	554	556	557	558	561	586	590	593	594	595	597	598
VR101	42	4	8	31	22	5						1					1	4	1			2							
VR104		2	1	2	4		2		2			23																	
VR107		3	32		3												2		11			3	40		79		2	44	2
VR108		3	6		2						2				5		1	3				4	58				3		4
VR110													1																
VR112					3					8			3					1				3							
VR113	3				16	7	1										1	2		24		5							
VR114		2																				7	1						30
VR115																									21			1	1
VR116										6								3											8
VR117		3	22	13	21																								
VR118			8		6	1	1																						
VR119			1		16			4			1								3										
VR120																													
VR121			3		3														1										
VR122																													
VR123				1															2	3									
VR124	6	1			32					1			1					13	7	56	70		24						
VR125		1																						5	1	16		21	7
VR126																													
VR130	11	11	2	28	29																								
VR131																													
VR132					1								4																
VR133																				5									
VR134																													
VR135	4		1																										1
VR136	7					5																							

• FIG. 12

## Optimal vs. Original Distribution Plans

	<b><i>Original (\$)</i></b>	<b><i>Optimal (\$)</i></b>	<b><i>Change (\$)</i></b>
<b><i>Profit</i></b>	19,291,821	19,599,321	307,500
<b><i>Auction Revenue</i></b>	19,557,169	20,145,360	588,191
<b><i>Shipping Cost</i></b>	(131,947)	(381,808)	(249,861)
<b><i>Time Value Cost</i></b>	(25,158)	(35,314)	(10,156)
<b><i>Volume Elasticity Cost</i></b>	(59,230)	(53,770)	5,460
<b><i>Shipping Waste Cost</i></b>	(49,013)	(75,147)	(26,134)

• FIG. 13

Summary | Shipping | Inventory | Source | Price

Select

Vehicle Model Year

All

Vehicle Model

All

Package

All

Auction Site

Site22 (IN)

Display

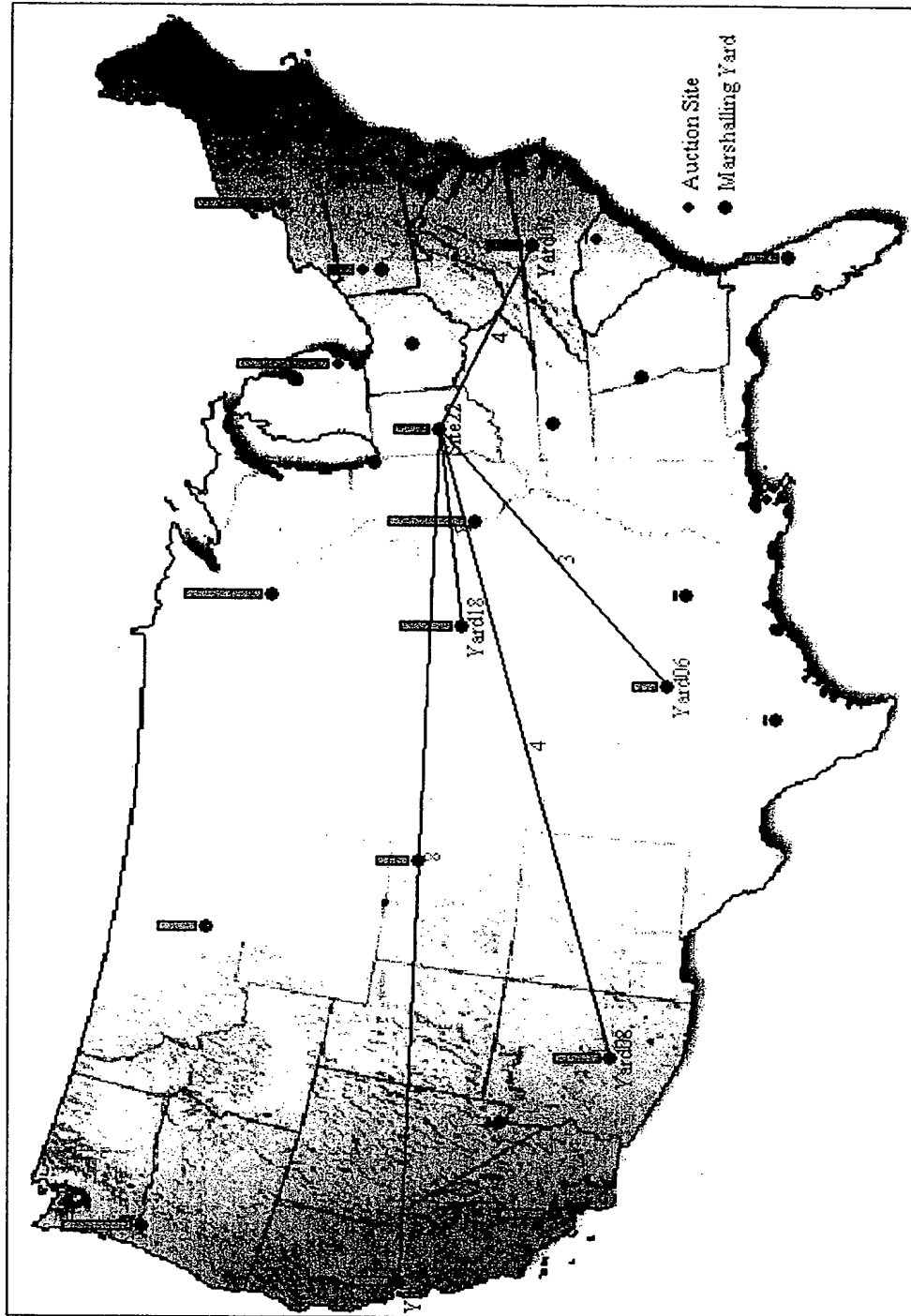
Save Results

File Directory

C:\Projects\ODAV\_DISTRIBUTI

File Name

Save



Site Name	Veh. No.	Sale Price (\$)	Ship. T (d)	Ship. Cost (\$)	T to Auc (d)	Time Cost (\$)	Elec Cost (\$)	Ship Multi Cost (\$)	Profit (\$)	Auc. D
Yard03 (CA)	8	10,573	2.7	5,360	3	240	0	0.00	78,991	1/2/21
Yard06 (TX)	3	20,072	2.5	1,098	3	90	0	1830.00	57,198	1/2/21
Yard07 (NC)	4	12,446	1.2	764	3	120	0	764.00	48,138	1/2/21
Yard08 (AZ)	4	20,072	1.0	2,440	3	120	0	2440.00	75,288	1/2/21
Yard18 (MO)	8	15,160	0.6	1,560	3	240	0	0.00	119,482	1/2/21

OK Cancel

Help

FIG. 14

Select

Vehicle Model Year

All

Vehicle Model

All

Package

All

Marshalling Yard

Yard03 (CA)

Display

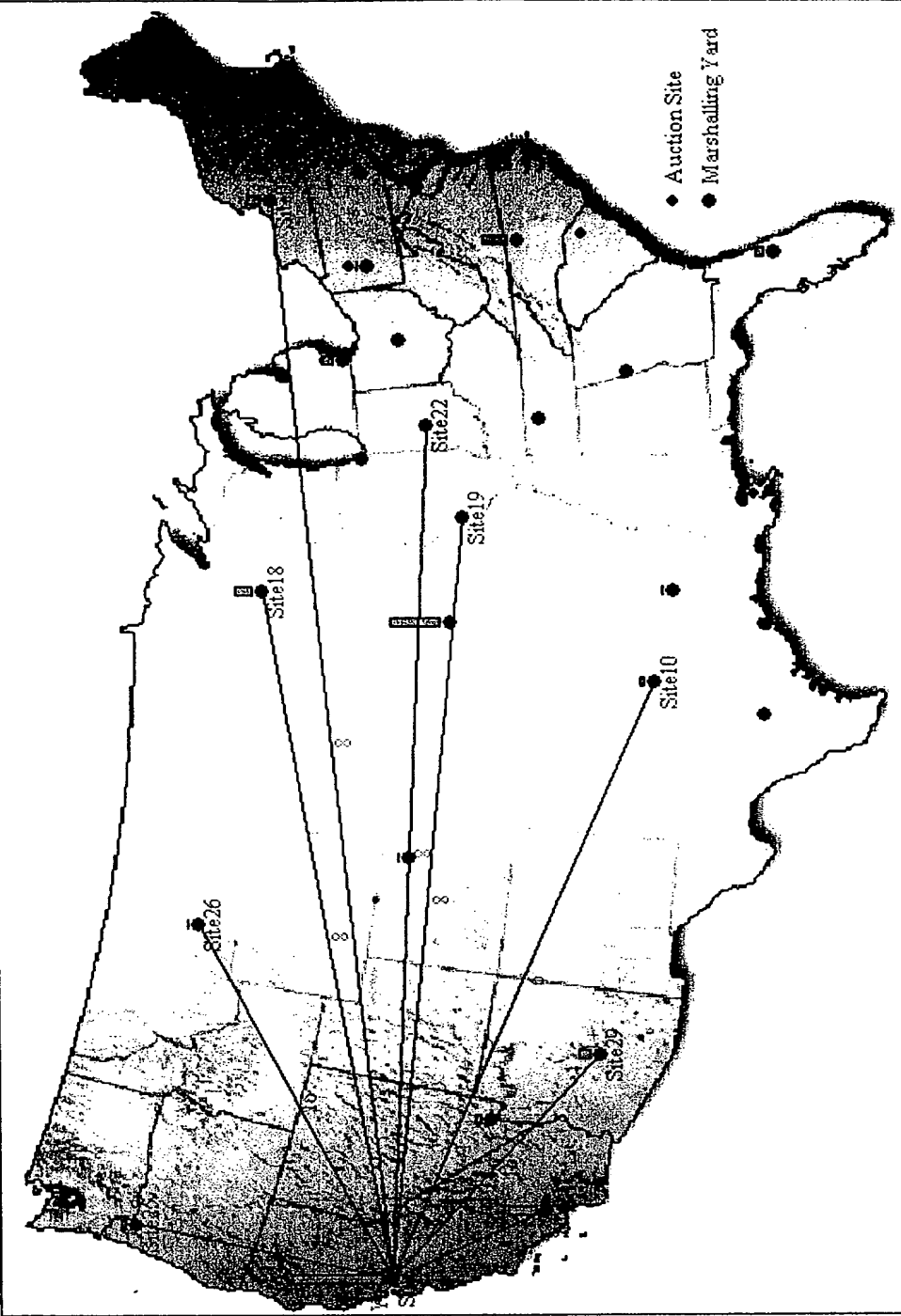
Save Results

File Directory

C:\Projects\ODAV\_DISTRIBUTI

File Name

Save



Site Name	Veh. No.	Sale Price (\$)	Ship. I (d)	Ship. Cost (\$)	I to Auc (d)	Time Cost (\$)	Elas Cost (\$)	Ship Multi Cost (\$)	Profit (\$)	Auc
Site03 (NY)	8	20,381	17.2	6,384	30	2,400	670	0	153,598	1/2
Site10 (TX)	6	11,086	8.8	3,240	17	1,020	0	1,080	61,180	1/1
Site18 (MN)	8	17,264	3.7	4,752	16	1,280	345	0	131,735	1/1
Site19 (MO)	8	14,606	2.7	4,600	4	320	880	0	111,048	1/2
Site22 (IN)	8	10,573	2.7	5,360	3	240	0	0	78,991	1/2
Site23 (CA)	24	16,585	1.1	3,984	2	480	0	0	393,578	1/1

Select

Vehicle Model Year

2001

Vehicle Model

SUV 4wD

Package

All

Display

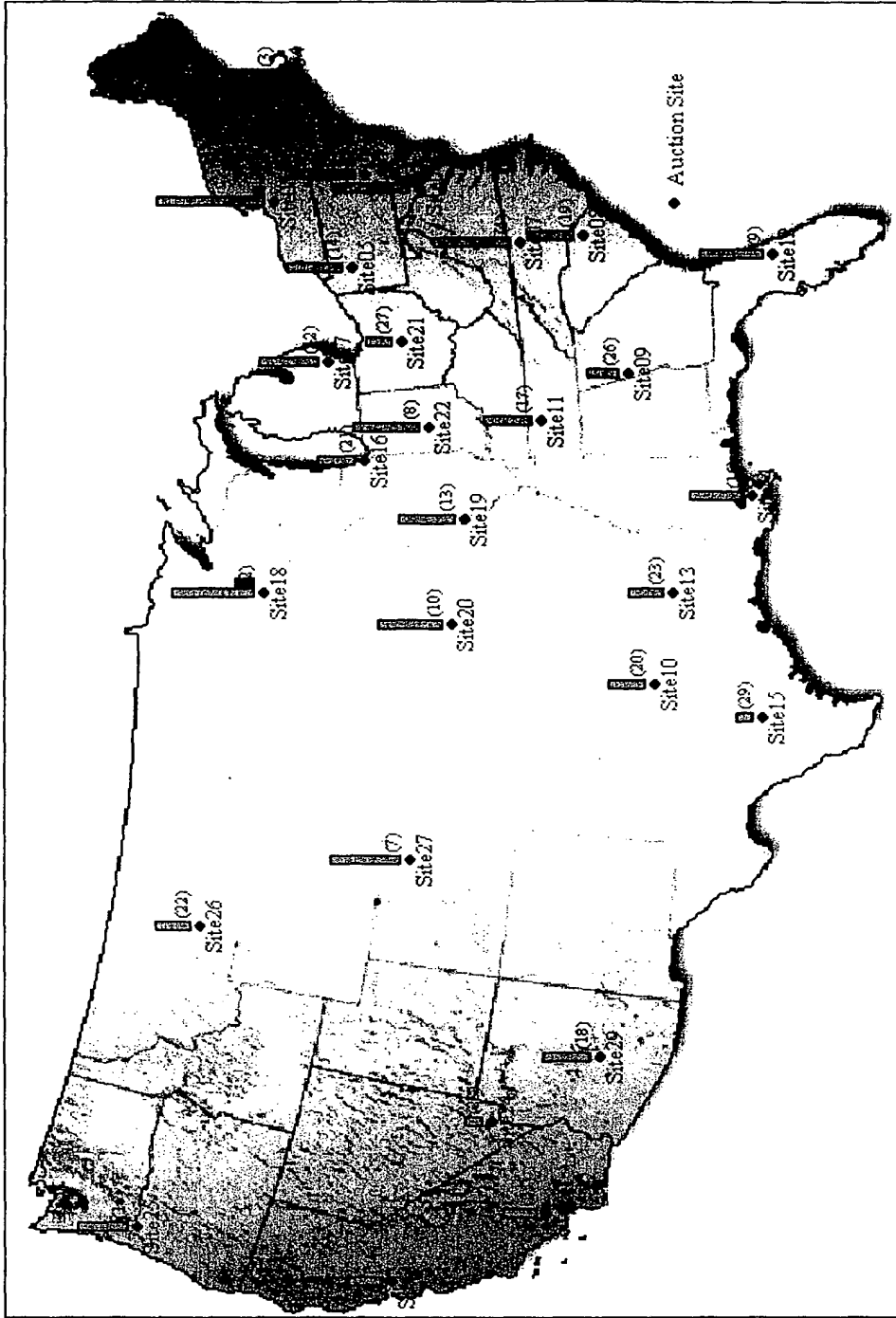
Save Results

File Directory

C:\Projects\NODAY\_DISTRIBUTI

File Name

Save



Label	Name	City	State	Zip	Price (\$)	Elas. Cost (\$)	Rank
Site01	Halffield	Halffield	PA	19440	20,097	0	6
Site02	Southern	E. Windsor Hill	CT	06088	19,951	0	11
Site03	Tri-State	Syracuse	NY	13039	20,656	65	1
Site04	America	North Dighton	MA	02764-0...	20,385	0	3
Site05	Butler	Ogle	PA	16066	19,862	0	14
Site06	Fredericks	Fredericks	VA	22402	20,197	0	5
Site07	Greensboro	Greensboro	NC	27407	20,205	0	4



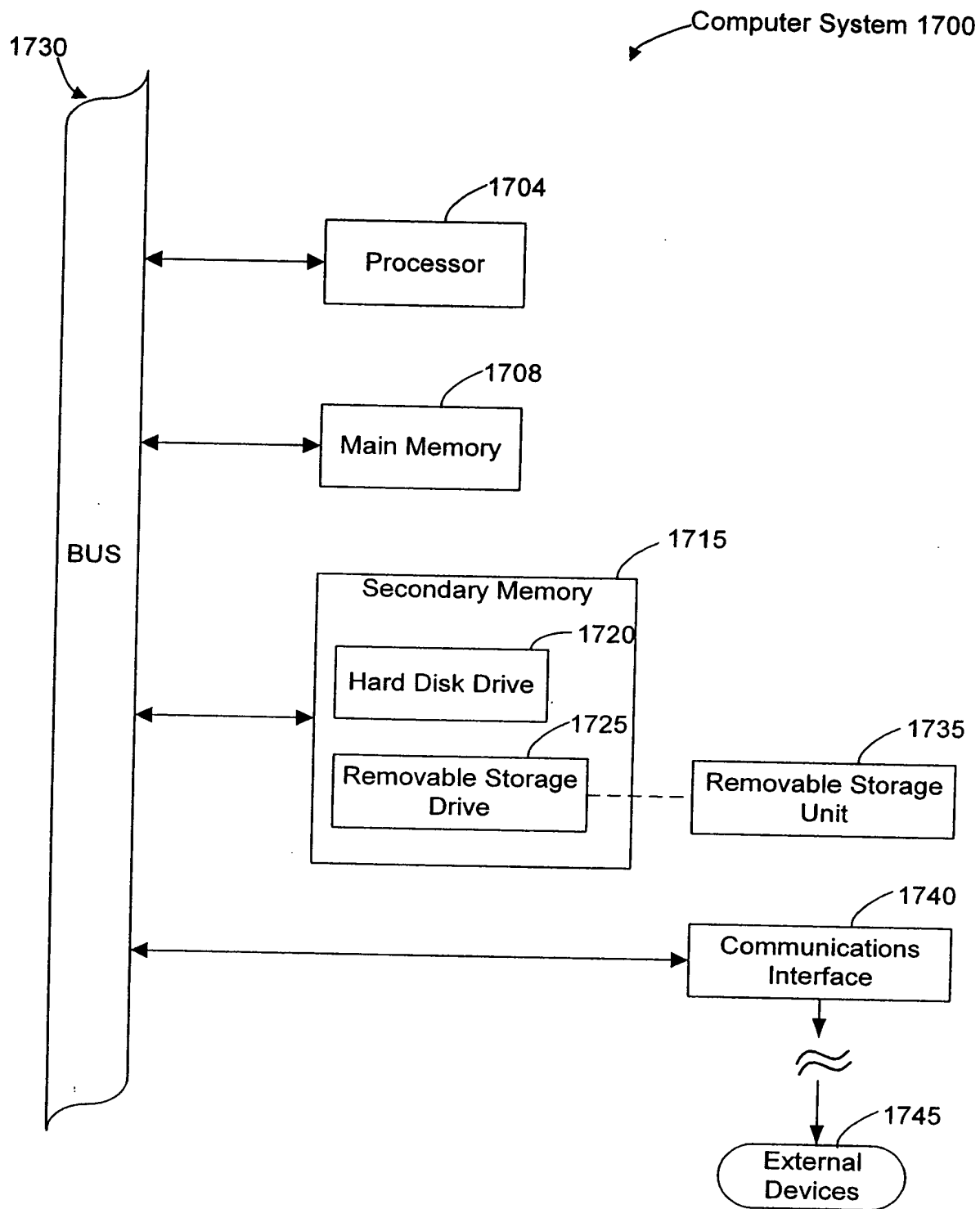
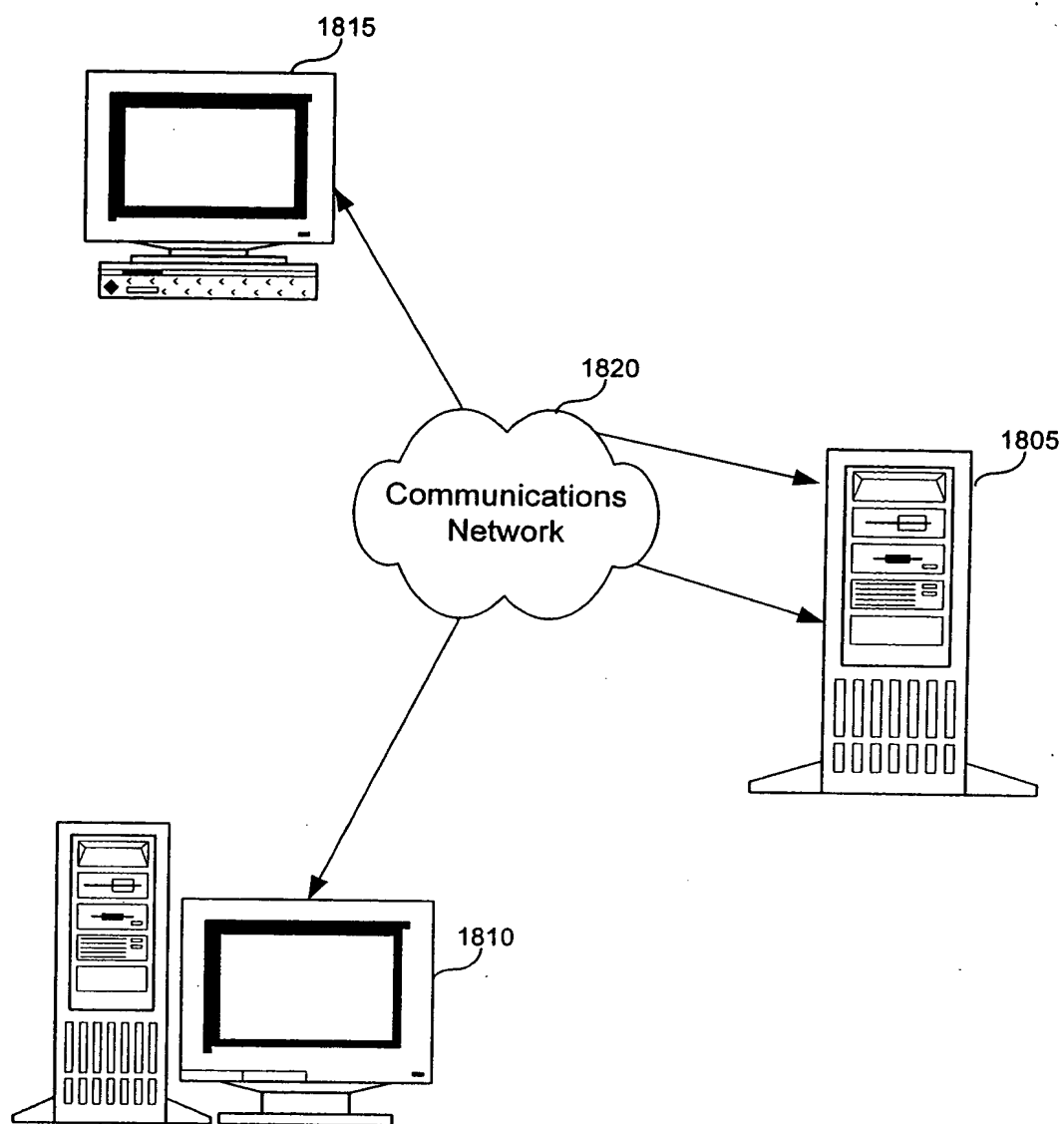


FIG. 17



**FIG. 18**